Chapter 6. Coastal Recovery Unit—Lower Deschutes River Critical Habitat Unit

Chapter 6. Lower Deschutes River Critical Habitat Unit

The Lower Deschutes River CHU is essential to the conservation of bull trout because populations here are genetically diverse; have diverse life history expressions including fluvial, adfluvial, and resident populations with extensive connectivity within and outside the CHU; and are the most robust in this part of the Mid-Columbia RU. The Deschutes River basin contains a variety of representative habitats, including high Cascade headwater streams, glacially fed streams, spring systems, lake habitat, and mainstem river habitat. Maintaining and recovering these populations will ensure conservation of adaptations to these unique habitats, and adequate redundancy within this basin and relative to adjacent core areas (e.g., Hood River, John Day River, etc.). Protecting and maintaining all five of the Deschutes River basin's bull trout populations will help ensure the long-term viability of these bull trout by protecting a geographically widespread distribution of unique but related bull trout (see Appendix 1 for more detailed information).

The Lower Deschutes River Critical Habitat Unit is located in Wasco, Sherman, Jefferson, Deschutes, and Crook counties in central Oregon. The Deschutes River basin contains a variety of representative habitats including high Cascade headwater streams, glacially fed streams, spring systems, lakes, and mainstem river habitat. The Confederated Tribes of the Warm Springs Reservation (CTWS) own lands in this CHU.

There are five known local populations in the lower Deschutes River basin. These are: 1) Warm Springs River; 2) Shitike Creek; 3) Whitewater River; 4) Jefferson Creek - Candle Creek Complex; and, 5) Jack Creek – Canyon Creek – Heising Spring Complex. The Bull Trout Draft Recovery Plan (Service 2002a, p. 32) states the persistence of five or more populations is needed for species' recovery. The five bull trout populations in the Deschutes CHU have diverse life history expressions including fluvial, adfluvial, and resident populations. While two of the five populations have adult abundance of several hundred adults, three populations have smaller adult counts of less than one hundred adults. The Deschutes River basin's Metolius River bull trout populations are the largest in Oregon. The five year average from 2005 to 2009 for Metolius River basin bull trout is 1,554 adults. The Metolius River populations are large enough to permit anglers in Lake Billy Chinook to retain one bull trout per day over 610 millimeters (24 inches) long. These populations have also been selected as donor stock for use in bull trout reintroduction efforts in the Clackamas River basin.

These populations are connected by migratory corridors in the Metolius and mainstem Deschutes rivers. These connections are essential to restore and maintain the metapopulation structure. Connectivity between these populations and the Columbia River also provides opportunity to connect the Deschutes River to other populations in the Coastal Conservation Unit. Thus, the entire occupied area is essential. The Deschutes River basin's bull trout populations have a wide genetic diversity. The five populations have maintained their unique character and attributes (DeHann et al. 2008, p. 10); the Whitewater River population in particular shows unique genetic diversity. Protecting and maintaining all five of the Deschutes River basin's bull trout populations will help ensure the long-term viability of these bull trout by protecting a geographically wide spread distribution of unique but related bull trout. Maintaining and recovering these diverse populations within this unit will ensure conservation of the bull trout adapted to unique high desert and Cascade habitats. The Bull Trout Draft Recovery Plan states the persistence of five or more populations is needed for bull trout recovery.

The Deschutes River Critical Habitat Unit includes: 1) the mainstem Deschutes River from its confluence with Columbia River upstream to the Pelton Reregulating dam; 2) the mainstem Deschutes River from Lake Billy Chinook to Big Falls; 3) Warm Springs River; 4) Shitike Creek; 5) Trout Creek; 6) Crooked River from its confluence with Lake Billy Chinook upstream to Highway 97; 7) Metolius River basin consisting of the mainstem Metolius River, Street Creek, Whitewater River, Jefferson Creek and an un-named tributary, Candle Creek, Abbot Creek, Canyon Creek and its un-named tributaries, Jack Creek, Heising Spring, Lake Creek and its tributaries (including Link Creek, Suttle Lake and Blue Lake); and 8) Whychus Creek upstream to the USFS 6360 road crossing.

Rationale for determining Critical Habitat based on the Seven Guiding Principles

1. *Conserve opportunity for diverse life-history expression* - The five bull trout populations in the Lower Deschutes River basin have diverse life history expressions. The Confederated Tribes of the Warm Springs Reservation (CTWS) bull trout population in the Shitike Creek and Warm Springs River are fluvial. Adults forage, migrate, and overwinter in the mainstem Deschutes River, while spawning and rearing (SR) occurs in tributary streams. The three Metolius Populations are adfluvial. While the Canyon- Jack-Heising Spring complex and Jefferson-Candle Creek spawners have similar spawning timings, the Whitewater River bull trout have very different life histories associated with the glacially fed character of this spawning stream. Several populations may also have resident life histories.

2. *Conserve opportunity for genetic diversity* - The Lower Deschutes River basin's bull trout population have a wide genetic diversity. Genetic analysis suggests that while populations have exchanged genetic material, the five populations have maintained their unique character and attributes (DeHann et al. 2008, p. 10). The Whitewater River population in particular shows unique genetic diversity.

3. *Ensure bull trout are distributed across representative habitats* - The Deschutes River basin bull trout occupy a range of habitats representative of Oregon's high desert. These include diverse habitats such as high Cascades headwater streams, glacially fed streams, and spring systems. Maintaining and recovering these populations will ensure that the Service is protecting populations that are adapted to these unique habitats.

4. *Ensure sufficient connectivity among populations* - The five Deschutes River populations are connected by migratory corridors in the Metolius River and mainstem Deschutes River. These corridors are essential to restore and maintain metapopulation structure for these populations. Passage at the Pelton Round Butte hydro project dams is being addressed as part of the project's 2004 Federal Energy Regulatory Commission license.

5. *Ensure sufficient habitat to support population viability (e.g., abundance, trend indices)* - Deschutes River bull trout depend on a variety of habitats to complete their life history and maintain population viability. Bull trout spawning habitat is unique in character and limited in abundance. Protecting spawning and rearing habitat, migratory corridors, and foraging areas is essential to ensure long-term viability of the Deschutes River bull trout populations. Designated Deschutes CH includes the known spawning, rearing, and foraging habitats, as well as migratory corridors needed to connect populations.

6. *Consider threats (e.g., climate change)* - Threats such as catastrophic fire, invasive species of fish, and climate change can all adversely affect bull trout populations. Protecting the Deschutes

River five populations will ensure the long-term viability of these populations by a geographically wide spread distribution of unique but related bull trout populations. The spring-fed hydrology of the Deschutes River spawning areas may help to mitigate the effects of increasing temperatures and reduced snowpack associated with climate change.

7. *Ensure sufficient redundancy in conserving population units* - Protecting and maintaining all five of the Deschutes River basin's bull trout populations will ensure adequate redundancy in the Deschutes. While two of the five populations have adult population of several hundred adults, three populations have smaller adult counts of less than one hundred. Threats to some of the smaller populations could result in their extirpation. Thus, it is essential maintain all the existing populations in the event of some population loss.

The following water bodies are included in this CHU (see Table 29)

Deschutes River from the confluence with the Columbia River at km 329.8 (mi 204.5) to Big Falls at km 212 (mi 131.5) is FMO habitat for fluvial bull trout (Buchanan et al. 1997, p. 57). This mainstem reach is important FMO habitat for local populations and as connectivity to essential Columbia River FMO habitat and adjacent core areas. It does not include the section of river and reservoir between Round Butte and the Reregulating dams because the area does not provide suitable bull trout habitat nor is there volitional passage through the dams. Upstream and downstream trap and haul of fish around Round Butte, Pelton, and Reregulation dams will be operational in February 2010 in order to provide passage for bull trout. A study conducted by the CTWS found that Deschutes River bull trout migrated from the Deschutes into the Columbia River (J. Graham, pers. comm., 2008). The Deschutes River provides connectivity between all five of the Deschutes River populations. This metapopulation structure is similar to the structure that has historically existed in the Deschutes. Lake Billy Chinook also provides connectivity, and is also important FMO habitat for three of the five populations.

Deschutes River from the confluence with the Columbia River at km 329.8 (mi 204.5) to Big Falls at km 212 (mi 131.5) is FMO habitat for bull trout, excluding the Deschutes River to its midpoint from the Pelton Reregulation Dam at RM 100.5 downstream to the CTWS boundary at about RM 69.2.

> *Trout Creek* from its confluence with the Deschutes River at km 146 (mi 87.5) upstream 3.3 km (2.1 mi) is FMO habitat.

Shitike Creek from its confluence with the Deschutes River at river km 155.04 (mi 96.12) upstream 32.0 km (19.2 mi) is FMO habitat and upstream 12.4 km (7.5 mi) to its source is SR habitat. Shitike Creek contains a local population. Shitike Creek is identified as a local population in the Bull Trout Draft Recovery Plan (Service 2002a, p. 7). This is one of two Deschutes River fluvial populations. Like the Warm Springs River population, it provides important life history and geographic diversity. Though this population is slightly larger than the Shitike Creek population, it is also vulnerable to natural population variations and negative effects from habitat modification or drought conditions (Burchell 2007, p. 12).

Warm Springs River from its confluence with the Deschutes River at km 134.22 (mi 83.22) upstream 45.1 km (27.1 mi) is FMO habitat and SR habitat extends 25.0 km (15.01 mi) upstream. The Warm Springs River is identified as a local population in the Bull Trout Draft Recovery Plan (Service 2002a, p. 7). This population is important because it is one the two fluvial populations in the Deschutes River, and provides important life history and geographic

diversity. It is a relatively small population, and thus is potentially more vulnerable to natural population variation and negative effects from habitat modification or drought conditions (Burchell 2007, p. 12).

> *Bunch Grass Creek* is SR habitat from its confluence with the Warm Springs River upstream 10.07 km (6.24 mi) to its source at Cold Springs. The Warm Springs River contains a local population.

Lake Billy Chinook (1543.06 ha; 3812.96 ac) is a reservoir on the Deschutes River and is essential FMO habitat. Lake Billy Chinook provides important foraging and overwintering habitat for three adfluvial bull trout populations that spawn in the Metolius River basin and connectivity between the Deschutes, Metolius, and Crooked Rivers. Critical habitat includes the reservoir to the ordinary high water elevations and normal operating pool elevations, respectively. The Oregon Department of Fish and Wildlife permits angling and harvest of bull trout in Lake Billy Chinook. This area of critical habitat provides several important functions for bull trout. Fish passage at this reservoir's Round Butte Dam will be operational in February, 2010. Because this fish passage structure will prevent any fish from passing downstream of Round Butte Dam into Lake Simtutus or the Reregulation Reservoir, no critical habitat is designated in these reservoirs.

Street Creek from its confluence with Lake Billy Chinook upstream 4.6 km (2.8 mi) is occupied FMO habitat (mostly rearing). This area is important because it allows bull trout in Lake Billy Chinook to disperse out of the reservoir, which decreases the potential for population loss from cannibalism. Cannibalism can have significant effects on populations, particularly when other forage species are not available (Beauchamp and Shepard 2008, p. 6).

Crooked River from its confluence with Lake Billy Chinook upstream to the Highway 97 Bridge provides FMO habitat. The Crooked River from its confluence with Lake Billy Chinook at km 189.85 (mi 117.7) upstream 1.7 km (1.18 mi) to Opal Springs Dam is occupied FMO habitat. From Opal Springs dam upstream 17.9 km (11.1 mi) to the Highway 97 bridge crossing is unoccupied potential FMO habitat. Few records of bull trout have been made, but cold water springs along the length of Crooked River Gorge, provides suitable habitat for bull trout. Because numerous large, cold springs enter this section of the Crooked River, the habitat is currently suitable for cold-water salmonids (Torgersen 2007, p. 17) such as bull trout. Fish passage was not provided when the Opal Springs Dam was enlarged in 1983, making the Dam an impassable barrier to upstream movement (Buchanan et al. 1997, p. 58). The Bull Trout Draft Recovery Plan (Service 2002a, p. 41) calls for restoring connectivity and opportunities for migration in Crooked River by constructing upstream fish passage at Opal Springs Dam (task 1.2.4). This area is important because it would allow bull trout in Lake Billy Chinook to disperse out of the reservoir, which would decrease the potential for population loss from cannibalism. Cannibalism can have significant effects on populations, particularly when other forage species are not available (Beauchamp and Shepard 2008, p. 6).

Metolius River from its confluence with Lake Billy Chinook at km 195.3 (121.1 mi) upstream 37.8 km (23.5 mi) to its confluence with Jack Creek is occupied FMO habitat. The Metolius River upstream of Jack Creek 7.4 km (4.6 mi) to the springs at its source is occupied SR habitat (Buchanan et al. 1997, p. 61). This area is important as a migratory corridor for three of the five Deschutes River's bull trout populations, and allows exchange of individuals and genetic material between these three populations. The upper reaches also provide some SR habitat, and

are considered to be part of the Jack Creek-Canyon Creek-Heising Spring-Upper Metolius River population. The Metolius River adfluvial populations are significantly larger than the Warm Spring River and Shitike Creek populations, and represent an important source of individual fish and genetic diversity for the Deschutes River basin.

Whitewater River from its confluence with the Metolius River at km 9.2 (5.7 mi) upstream 19.4 km (12.0 mi) to its source is SR habitat (Buchanan et al. 1997, p. 58). Whitewater River contains a local population (Service 2002a, p. 7). This area is important due to its unique physical habitat and genetically unique bull trout. The river is glacially fed, unlike the spring-fed systems that support other Metolius River bull trout populations. These bull trout are also genetically unique from other Metolius and Deschutes basin bull trout (DeHann et al. 2008, p. 10), due in part to their unusual physical habitat.

Candle Creek from its confluence with the Metolius River at km 25.7 (mi 15.9) upstream 6.26 km (3.9 mi) to Cabot Creek is SR habitat. This area is essential because it supports a significant number of spawning bull trout, and also provides important rearing habitat. Candle Creek is one of two streams that make up one of the three Metolius River bull trout populations.

Jefferson Creek from its confluence with the Metolius River at km 25.5 (mi 15.8) upstream 10.2 km (6.3 mi) to its confluence with an un-named tributary is SR habitat (Buchanan et al. 1997, p. 61). This area is important because it supports a significant number of spawning bull trout, and also provides important rearing habitat. Jefferson Creek is one of two streams that make up one of the three Metolius River bull trout populations.

> *Unnamed tributary* to Jefferson Creek at km 10.4 (mi 6.5) upstream 1.1 km (0. 0.7 mi) to its source is FMO habitat (Buchanan et al. 1997, p. 61).

Abbot Creek from its confluence with the Metolius River at km 26.29 (mi 16.30) upstream 5.44 km (3.38 mi) to its source spring on the south east side of Abbot Butte is occupied rearing habitat (Buchanan et al. 1997, p. 61). Abbot Creek is important rearing habitat for bull trout in the area of the Jefferson Creek-Candle Creek population.

Canyon Creek from its confluence with the Metolius River at km 36.1 (mi 22.4) upstream 9.1 km (5.6 mi) to U.S. Forest Service (USFS) Road 1235 is SR habitat. Canyon Creek, together with Roaring Creek, support a large number of spawning bull trout.

> *Unnamed tributary* to Canyon Creek (east of and parallel to Brush Creek) upstream 3.3 km (2.1 mi) is SR habitat. This is essential habitat to the Canyon / Roaring creek population.
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> *Brush Creek* from its confluence with Canyon Creek at km 1.5 (mi 0.9), upstream 6.2 km (3.9 mi) to Forest Service Road 1230 is SR habitat. This is essential habitat to the Canyon / Roaring creek population.
>
> *Roaring Creek* from its confluence with Canyon Creek at km 3.9 (mi 2.4) upstream 2.9 km (1.8 miles) to its headwater springs; is SR habitat. Canyon Creek, together with Roaring Creek, support a large number of spawning bull trout.
>
> > Unnamed tributary to Roaring Creek (west of Roaring Creek) 1.0 km (0.6 mi) to the intersection of Forest Service roads 1260 and 1230 is SR habitat. This is essential habitat to the Canyon / Roaring creek population.

Unnamed tributary to Roaring Creek (north of and parallel to Roaring Creek) upstream 0.6 km (0.4 mi) to the source springs is FMO habitat. This is essential habitat to the Canyon / Roaring creek population.

Unnamed tributary to Roaring Creek (west of Roaring Creek) upstream 0.33 km (0.2 mi) is FMO habitat. This is essential habitat to the Canyon / Roaring creek population.

Jack Creek upstream from its confluence with the Metolius River at km 37.3 (mi 23.1) upstream 7.6 km (4.7 mi) to its source springs is SR habitat (N. Dachtler, pers. comm., 2009). This area provides important spawning and rearing habitat, and supports a significant element of the Jack Creek-Canyon Creek-Heising Spring-Metolius spawning complex. This complex has the largest number of spawning bull trout in the Deschutes River basin.

Unnamed tributary to Jack Creek has 0.1 km (0.1 mi) is SR habitat that is essential habitat to the Jack Creek-Canyon Creek-Heising Spring-Metolius spawning complex.

Unnamed tributary to the unnamed tributary to Jack Creek has 0.1 km (0.03 mi) of SR habitat that is essential habitat to the Jack Creek-Canyon Creek-Heising Spring-Metolius spawning complex.

Unnamed tributary to Jack Creek has 0.2 km (0.1 mi) of SR habitat that is essential habitat to the Jack Creek-Canyon Creek-Heising Spring-Metolius spawning complex.

Heising Spring upstream from its confluence with the Metolius River near the mouth of Jack Creek upstream 0.4 km (0.2 mi) to its source is SR habitat that is essential habitat to the Jack Creek-Canyon Creek-Heising Spring-Metolius spawning complex. This area is important as part of the overall spawning complex. It is a large, low-gradient assemblage of cold springs, and provides unique spawning and rearing habitat directly adjacent to the mainstem Metolius River.

Lake Creek and its tributaries from its confluence with the Metolius River contains FMO and SR habitat. The Lake Creek stream system is composed of a reverse dendritic pattern. As Lake Creek flows downstream it splits into the North Fork, Middle Fork and South Fork. The South Fork and Middle Fork flow back together again to become the mainstem Lake Creek before entering the Metolius River.

The North Fork is an unoccupied canal that flows 4.82 km (3.0 mi) before reaching Spring Creek, and is not critical habitat. The North Fork is separated from Spring Creek by an impassable dam.

Spring Creek from the confluence with Lake Creek, upstream 1.0 km (0.6 mi) of occupied SR habitat.

Middle Fork Lake Creek from its confluence with the Metolius River at km 42.3 (mi 26.2) upstream 6.2 km (3.9 mi) to Lake Creek is unoccupied potential FMO habitat.

South Fork Lake Creek from its confluence with Middle Fork Lake Creek at km 2.5 (mi 1.5) upstream 4.1 km (2.5 mi) to Lake Creek is unoccupied potential FMO habitat.

Lake Creek from its confluence with Middle and South Forks Lake Creek upstream 2.4 km (1.5 mi) to Suttle Lake is unoccupied potential FMO habitat. These streams are identified as a recovery need in the Bull Trout Draft Recovery Plan as a potential local population in historic habitat. Though it is too warm to support spawning, the Lake

Creek system could provide important rearing and FMO habitat for bull trout. Overall, this area provides important potential FMO and SR habitat for Metolius River basin bull trout.

Suttle Lake (104.83 ha; 259.04 ac) is unoccupied potential FMO habitat although two juvenile bull trout have been observed in the lower reaches of Lake Creek (a tributary to Suttle Lake). It is identified as a recovery need in the Bull Trout Draft Recovery Plan as a potential local population in historic habitat. There has been one observation of two juvenile bull trout in the lower reaches of Lake Creek (J. Lovtang, pers. comm., 2009).

Link Creek from Suttle Lake, upstream 0.9 km (0.6 mi) to Blue Lake is unoccupied potential FMO habitat. It is identified as a recovery need in the Bull Trout Draft Recovery Plan as a potential local population in historic habitat. Link Creek flows out of Blue Lake into Suttle Lake, which is also a natural lake. Link Creek is historic bull trout spawning habitat (Buchanan et al. 1997, p. 58), and may have supported a later spawning bull trout population than other Metolius spawning areas. This is because Link Creek water temperatures do not fall below 10 C until mid-October (ODEQ 2001, no page number, information is from website http://deq12.deq.state.or.us/lasar2). Overall, this area provides important potential FMO and SR habitat for Metolius River basin bull trout.

Blue Lake (22.3 hectares; 55.2 acres) is unoccupied potential FMO habitat. It is identified as a recovery need in the Bull Trout Draft Recovery Plan as a potential local population in historic habitat. Blue Lake is a unique, deep, cold natural lake fed by springs.

Whychus Creek from its confluence with the Deschutes River at km 195.8 (mi 121.4) upstream 2.4 kilometers (1.5 mi) past Alder Spring at km 2.4 (mi 1.5) and upstream to the USFS 6360 road crossing at km 9.2 (mi 5.5) is FMO habitat. The Bull Trout Draft Recovery Plan calls for restoring connectivity and opportunities for migration by securing instream flows in Whychus Creek. This area is important because it would allow bull trout in Lake Billy Chinook to disperse out of the reservoir, which would decrease the potential for population loss from cannibalism. Cannibalism can have significant effects on populations, particularly when other forage species are not available (Beauchamp and Shepard 2008, p. 6).

Table 29. Water body segments designated as critical habitat for bull trout, including documentation of occupancy and site-specific rationale in the Lower Deschutes River CHU/CHSU

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Lower Deschutes River—None	Abbot Creek	OR	Abbot Creek from its confluence with the Metolius River at km 26.29 (mi 16.30) upstream 5.44 km (3.38 mi) to its source spring on the south east side of Abbot Butte is occupied rearing habitat (Buchanan et al. 1997, p. 61). Abbot Creek is important rearing habitat for bull trout in the area of the Jefferson Creek-Candle Creek population.	See text for this CHU	1216335 456049
Lower Deschutes River—None	Brush Creek	OR	Brush Creek from its confluence with Canyon Creek at km 1.5 (mi 0.9) upstream 6.2 km (3.9 mi) to Forest Service Road 1230 is SR habitat. This is essential habitat to the Canyon / Roaring creek population.	See text for this CHU	1216654 454600
Lower Deschutes River—None	Bunch Grass Creek	OR	Bunch Grass Creek is SR habitat from its confluence with the Warm Springs River upstream 10.07 km (6.24 mi) to its source at Cold Springs. The Warm Springs River contains a local population.	See text for this CHU	1216205 445703
Lower Deschutes River—None	Candle Creek	OR	Candle Creek from its confluence with the Metolius River at km 25.7 (mi 15.9) upstream 6.26 km (3.9 mi) to Cabot Creek is SR habitat. This area is essential because it supports a significant number of spawning bull trout, and also provides important rearing habitat. Candle Creek is one of two streams that make up one of the three Metolius River bull trout populations.	See text for this CHU	1216588 445040
Lower Deschutes River—None	Canyon Creek	OR	Canyon Creek from its confluence with the Metolius River at km 36.1 (mi 22.4) upstream 9.1 km (5.6 mi) to U.S. Forest Service (USFS) Road 1235 is SR habitat. Canyon Creek, together with Roaring Creek, support a large number of spawning bull trout.	See text for this CHU	1216440 449870

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Lower Deschutes River—None	Crooked River	OR	Crooked River from its confluence with Lake Billy Chinook upstream to the Highway 97 Bridge provides FMO habitat. The Crooked River from its confluence with Lake Billy Chinook at km 189.85 (mi 117.7) upstream 1.7 km (1.18 mi) to Opal Springs Dam is occupied FMO habitat. From Opal Springs dam upstream 17.9 km (11.1 mi) to the Highway 97 bridge crossing is unoccupied potential FMO habitat. Few records of bull trout have been made, but cold water springs along the length of Crooked River Gorge, provides suitable habitat for bull trout. Because numerous large, cold springs enter this section of the Crooked River, the habitat is currently suitable for cold-water salmonids (Torgersen et al. 2007, p. 17) such as bull trout. Fish passage was not provided when the Opal Springs Dam was enlarged in 1983, making the Dam an impassable barrier to upstream movement (Buchanan et al. 1997, p. 58). The Bull Trout Draft Recovery Plan (Service 2002a, p. 41) calls for restoring connectivity and opportunities for migration in Crooked River by constructing upstream fish passage at Opal Springs Dam (task 1.2.4). This area is important because it would allow bull trout in Lake Billy Chinook to disperse out of the reservoir, which would decrease the potential for population loss from cannibalism. Cannibalism can have significant effects on populations, particularly when other forage species are not available (Beauchamp and Shepard 2008, p. 6).	See text for this CHU	1212676 445778

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Lower Deschutes River—None	Deschutes River	OR	Deschutes River from the confluence with the Columbia River at km 329.8 (mi 204.5) to Big Falls at km 212 (mi 131.5) is FMO habitat for fluvial bull trout (Buchanan et al. 1997, p. 57). This mainstem reach is important FMO habitat for local populations and as connectivity to essential Columbia River FMO habitat and adjacent core areas. It does not include the section of river and reservoir between Round Butte and the Reregulating dams because the area does not provide suitable bull trout habitat nor is there volitional passage through the dams. Upstream and downstream trap and haul of fish around Round Butte, Pelton, and Reregulation dams will be operational in February 2010 in order to provide passage for bull trout. A study conducted by the CTWS found that Deschutes River bull trout migrated from the Deschutes into the Columbia River (J. Graham, pers. comm., 2008). The Deschutes River provides connectivity between all five of the Deschutes River populations. This metapopulation structure is similar to the structure that has historically existed in the Deschutes. Lake Billy Chinook also provides connectivity, and is also important FMO habitat for three of the five populations. Deschutes River from the confluence with the Columbia River at km 329.8 (mi 204.5) to Big Falls at km 212 (mi 131.5) is FMO habitat for bull trout, excluding the Deschutes River to its midpoint from the Pelton Reregulation Dam at RM 100.5 downstream to the CTWS boundary at about RM 69.2.	See text for this CHU	1209151 456389
Lower Deschutes River—None	Heising Spring	OR	Heising Spring upstream from its confluence with the Metolius River near the mouth of Jack Creek upstream 0.4 km (0.2 mi) to its source is SR habitat that is essential habitat to the Jack Creek-Canyon Creek-Heising Spring-Metolius spawning complex. This area is important as part of the overall spawning complex. It is a large, low-gradient assemblage of cold springs, and provides unique spawning and rearing habitat directly adjacent to the mainstem Metolius River.	See text for this CHU	1212676 445778.2

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Lower Deschutes River—None	Jack Creek	OR	Jack Creek upstream from its confluence with the Metolius River at km 37.3 (mi 23.1) upstream 7.6 km (4.7 mi) to its source springs is SR habitat (N. Dachtler, pers. comm., 2009). This area provides important spawning and rearing habitat, and supports a significant element of the Jack Creek-Canyon Creek-Heising Spring-Metolius spawning complex. This complex has the largest number of spawning bull trout in the Deschutes River basin.	See text for this CHU	1209151 456389.1
Lower Deschutes River—None	Jefferson Creek	OR	Jefferson Creek from its confluence with the Metolius River at km 25.5 (mi 15.8) upstream 10.2 km (6.3 mi) to its confluence with an un-named tributary is SR habitat (Buchanan et al. 1997, p. 61). This area is important because it supports a significant number of spawning bull trout, and also provides important rearing habitat. Jefferson Creek is one of two streams that make up one of the three Metolius River bull trout populations.	See text for this CHU	1216480 444935
Lower Deschutes River—None	Lake Creek	OR	Lake Creek and its tributaries from its confluence with the Metolius River contains FMO and SR habitat. The Lake Creek stream system is composed of a reverse dendritic pattern. As Lake Creek flows downstream it splits into the North Fork, Middle Fork and South Fork. The South Fork and Middle Fork flow back together again to become the mainstem Lake Creek before entering the Metolius River. The North Fork is an unoccupied canal that flows 4.82 km (3.0 mi) before reaching Spring Creek, and is not critical habitat. The North Fork is separated from Spring Creek by an impassable dam.	See text for this CHU	1217028 444362
Lower Deschutes River—None	Lake Creek	OR	Lake Creek from its confluence with Middle and South Forks Lake Creek upstream 2.4 km (1.5 mi) to Suttle Lake is unoccupied potential FMO habitat. These streams are identified as a recovery need in the Bull Trout Draft Recovery Plan as a potential local population in historic habitat. Though it is too warm to support spawning, the Lake Creek system could provide important rearing and FMO habitat for bull trout. Overall, this area provides important potential FMO and SR habitat for Metolius River basin bull trout.	See text for this CHU	1217028 444362

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Lower Deschutes River—None	Link Creek	OR	Link Creek from Suttle Lake, upstream 0.9 km (0.6 mi) to Blue Lake is unoccupied potential FMO habitat. It is identified as a recovery need in the Bull Trout Draft Recovery Plan as a potential local population in historic habitat. Link Creek flows out of Blue Lake into Suttle Lake, which is also a natural lake. Link Creek is historic bull trout spawning habitat (Buchanan et al. 1997, p. 58), and may have supported a later spawning bull trout population than other Metolius spawning areas. This is because Link Creek water temperatures do not fall below 10 C until mid-October (ODEQ 2001, no page number, information is from website http://deq12.deq.state.or.us/lasar2). Overall, this area provides important potential FMO and SR habitat for Metolius River basin bull trout.	See text for this CHU	1216200 445766
Lower Deschutes River—None	Metolius River	OR	Metolius River from its confluence with Lake Billy Chinook at km 195.3 (121.1 mi) upstream 37.8 km (23.5 mi) to its confluence with Jack Creek is occupied FMO habitat. The Metolius River upstream of Jack Creek 7.4 km (4.6 mi) to the springs at its source is occupied SR habitat (Buchanan et al. 1997, p. 61). This area is important as a migratory corridor for three of the five Deschutes River's bull trout populations, and allows exchange of individuals and genetic material between these three populations. The upper reaches also provide some SR habitat, and are considered to be part of the Jack Creek-Canyon Creek-Heising Spring-Upper Metolius River population. The Metolius River adfluvial populations are significantly larger than the Warm Spring River and Shitike Creek populations, and represent an important source of individual fish and genetic diversity for the Deschutes River basin.	See text for this CHU	1212861 445954
Lower Deschutes River—None	Middle Fork Lake Creek	OR	Middle Fork Lake Creek from its confluence with the Metolius River at km 42.3 (mi 26.2) upstream 6.2 km (3.9 mi) to Lake Creek is unoccupied potential FMO habitat.	See text for this CHU	1212861 445954.1
Lower Deschutes River—None	Roaring Creek	OR	Roaring Creek from its confluence with Canyon Creek at km 3.9 (mi 2.4) upstream 2.9 km (1.8 miles) to its headwater springs; is SR habitat. Canyon Creek, together with Roaring Creek, support a large number of spawning bull trout.	See text for this CHU	1212861 445954.2

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Lower Deschutes River—None	Shitike Creek	OR	Shitike Creek from its confluence with the Deschutes River at river km 155.04 (mi 96.12) upstream 32.0 km (19.2 mi) is FMO habitat and upstream 12.4 km (7.5 mi) to its source is SR habitat. Shitike Creek contains a local population. Shitike Creek is identified as a local population in the Bull Trout Draft Recovery Plan (Service 2002a, p. 7). This is one of two Deschutes River fluvial populations. Like the Warm Springs River population, it provides important life history and geographic diversity. Though this population is slightly larger than the Shitike Creek population, it is also vulnerable to natural population variations and negative effects from habitat modification or drought conditions (Burchell 2007, p. 12).	See text for this CHU	1212285 447619
Lower Deschutes River—None	South Fork Lake Creek	OR	South Fork Lake Creek from its confluence with Middle Fork Lake Creek at km 2.5 (mi 1.5) upstream 4.1 km (2.5 mi) to Lake Creek is unoccupied potential FMO habitat.	See text for this CHU	1212285 447619.3
Lower Deschutes River—None	Spring Creek	OR	Spring Creek from the confluence with Lake Creek upstream 1.0 km (0.6 mi) of occupied SR habitat.	See text for this CHU	1212285 447619.4
Lower Deschutes River—None	Street Creek	OR	Street Creek from its confluence with Lake Billy Chinook upstream 4.6 km (2.8 mi) is occupied FMO habitat (mostly rearing). This area is important because it allows bull trout in Lake Billy Chinook to disperse out of the reservoir, which decreases the potential for population loss from cannibalism. Cannibalism can have significant effects on populations, particularly when other forage species are not available (Beauchamp and Shepard 2008, p. 6).	See text for this CHU	1216610 444417
Lower Deschutes River—None	Trout Creek	OR	Trout Creek from its confluence with the Deschutes River at km 146 (mi 87.5) upstream 3.3 km (2.1 mi) is FMO habitat.	See text for this CHU	1216425 444567
Lower Deschutes River—None	Unnamed tributary of Canyon Creek	OR	Unnamed tributary to Canyon Creek (east of and parallel to Brush Creek) upstream 3.3 km (2.1 mi) is SR habitat. This is essential habitat to the Canyon / Roaring creek population.	See text for this CHU	1214510 446002
Lower Deschutes River—None	Unnamed tributary of Jack Creek	OR	Unnamed tributary to Jack Creek has 0.1 km (0.1 mi) is SR habitat that is essential habitat to the Jack Creek-Canyon Creek-Heising Spring-Metolius spawning complex.	See text for this CHU	1217227 444766

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Lower Deschutes River—None	Unnamed tributary of Jack Creek	OR	Unnamed tributary to the unnamed tributary to Jack Creek has 0.1 km (0.03 mi) of SR habitat that is essential habitat to the Jack Creek-Canyon Creek-Heising Spring-Metolius spawning complex.	See text for this CHU	1217217 444763
Lower Deschutes River—None	Unnamed tributary of Jack Creek	OR	Unnamed tributary to Jack Creek has 0.2 km (0.1 mi) of SR habitat that is essential habitat to the Jack Creek-Canyon Creek-Heising Spring-Metolius spawning complex.	See text for this CHU	1217217 444764
Lower Deschutes River—None	Unnamed tributary of Jefferson Creek	OR	Unnamed tributary to Jefferson Creek at km 10.4 (mi 6.5) upstream 1.1 km (0. 0.7 mi) to its source is FMO habitat (Buchanan et al. 1997, p. 61).	See text for this CHU	1217217 444764
Lower Deschutes River—None	Unnamed tributary of Roaring Creek	OR	Unnamed tributary to Roaring Creek (west of Roaring Creek) 1.0 km (0.6 mi) to the intersection of Forest Service roads 1260 and 1230 is SR habitat. This is essential habitat to the Canyon / Roaring creek population.	See text for this CHU	1216986 445166
Lower Deschutes River—None	Unnamed tributary of Roaring Creek	OR	Unnamed tributary to Roaring Creek (north of and parallel to Roaring Creek) upstream 0.6 km (0.4 mi) to the source springs is FMO habitat. This is essential habitat to the Canyon / Roaring creek population.	See text for this CHU	1216986 445213
Lower Deschutes River—None	Unnamed tributary of Roaring Creek	OR	Unnamed tributary to Roaring Creek (west of Roaring Creek) upstream 0.33 km (0.2 mi) is FMO habitat. This is essential habitat to the Canyon / Roaring creek population.	See text for this CHU	1216999 445164
Lower Deschutes River—None	Warm Springs River	OR	Warm Springs River from its confluence with the Deschutes River at km 134.22 (mi 83.22) upstream 45.1 km (27.1 mi) is FMO habitat and SR habitat extends 25.0 km (15.01 mi) upstream. The Warm Springs River is identified as a local population in the Bull Trout Draft Recovery Plan (Service 2002a, p. 7). This population is important because it is one the two fluvial populations in the Deschutes River, and provides important life history and geographic diversity. It is a relatively small population, and thus is potentially more vulnerable to natural population variation and negative effects from habitat modification or drought conditions (Burchell 2007, p. 12).	See text for this CHU	1210605 448640

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Lower Deschutes River—None	Whitewater River	OR	Whitewater River from its confluence with the Metolius River at km 9.2 (5.7 mi) upstream 19.4 km (12.0 mi) to its source is SR habitat (Buchanan et al. 1997, p. 58). Whitewater River contains a local population (Service 2002a, p. 7). This area is important due to its unique physical habitat and genetically unique bull trout. The river is glacially fed, unlike the spring-fed systems that support other Metolius River bull trout populations. These bull trout are also genetically unique from other Metolius and Deschutes basin bull trout (DeHann et al. 2008, p. 10), due in part to their unusual physical habitat.	See text for this CHU	1214766 449698.3
Lower Deschutes River—None	Whychus Creek	OR	Whychus Creek from its confluence with the Deschutes River at km 195.8 (mi 121.4) upstream 2.4 kilometers (1.5 mi) past Alder Spring at km 2.4 (mi 1.5) and upstream to the USFS 6360 road crossing at km 9.2 (mi 5.5) is FMO habitat. The Bull Trout Draft Recovery Plan calls for restoring connectivity and opportunities for migration by securing instream flows in Whychus Creek. This area is important because it would allow bull trout in Lake Billy Chinook to disperse out of the reservoir, which would decrease the potential for population loss from cannibalism. Cannibalism can have significant effects on populations, particularly when other forage species are not available (Beauchamp and Shepard 2008, p. 6).	See text for this CHU	1214766 449698.4
Lower Deschutes River—None	Blue Lake	OR	Blue Lake (22.3 hectares; 55.2 acres) is unoccupied potential FMO habitat. It is identified as a recovery need in the Bull Trout Draft Recovery Plan as a potential local population in historic habitat. Blue Lake is a unique, deep, cold natural lake fed by springs.	See text for this CHU	1215457 446697

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Lower Deschutes River—None	Lake Billy Chinook	OR	Lake Billy Chinook (1543.06 ha; 3812.96 ac) is a reservoir on the Deschutes River and is essential FMO habitat. Lake Billy Chinook provides important foraging and overwintering habitat for three adfluvial bull trout populations that spawn in the Metolius River basin and connectivity between the Deschutes, Metolius, and Crooked rivers. Critical habitat includes the reservoir to the ordinary high water elevations and normal operating pool elevations, respectively. The Oregon Department of Fish and Wildlife permits angling and harvest of bull trout in Lake Billy Chinook. This area of critical habitat provides several important functions for bull trout. Fish passage at this reservoir's Round Butte Dam will be operational in February, 2010. Because this fish passage structure will prevent any fish from passing downstream of Round Butte Dam into Lake Simtutus or the Reregulation Reservoir, no critical habitat is designated in these reservoirs.	See text for this CHU	1213645 445891
Lower Deschutes River—None	Suttle Lake	OR	Suttle Lake (104.83 ha; 259.04 ac) is unoccupied potential FMO habitat although two juvenile bull trout have been observed in the lower reaches of Lake Creek (a tributary to Suttle Lake). It is identified as a recovery need in the Bull Trout Draft Recovery Plan as a potential local population in historic habitat. There has been one observation of two juvenile bull trout in the lower reaches of Lake Creek (J. Lovtang, pers. comm., 2009).	See text for this CHU	1214318 445887